

Non-invasive assessment of the severity of the autonomic lesion in spinal cord injury patients

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Keywords: Spinal cord injury; Autonomic nervous system; Sympathetic assessment; Classification

Objective.— To study the relation between severity of the somatic lesion and severity of the autonomic lesion.

Patients and method.— Thirty nine spinal cord injury (SCI) patients (21 tetraplegics and 18 paraplegics) presenting with a traumatic lesion above T10 were assessed (33 men and 6 women, mean age of 38 years and mean duration of evolution of 4,1 years). Twenty-nine had a motor and sensory complete lesion (American Incapacity Scale A), 7 a complete motor but incomplete sensory lesion (AIS B), 3 a motor incomplete lesion (AIS D).

All underwent a battery of autonomic tests with pressor stimuli above and below the lesion, including sympathetic skin responses (SSR), Valsalva Manoeuvre, abdominal electrical stimulation, and cold foot.

Results.—

Tetraplegics (14 AIS A & 7 AIS B).

All 21 SCI patients showed absent palmar and plantar SSR, absent blood pressure (BP) overshoot at the end of the Valsalva, and a significant rise in BP with pressor stimuli below the lesion.

Paraplegics \geq T6 (12 AIS A & 3 AIS D).

All 12 SCI patients with complete AIS A lesions presented with abolished plantar SSR and a significant rise in BP with pressor stimuli below the lesion. Palmar SSR and BP overshoot were obtained in a majority of patients.

Patients with incomplete AIS D lesions showed normal autonomic responses (presence of palmar and plantar SSR and of BP overshoot).

Paraplegics T7-T10 (3 AIS A).

They all showed normal autonomic responses (presence of palmar and plantar SSR and of BP overshoot).

Discussion.— All patients with a complete motor lesion (AIS A & AIS B) above T6 showed a total loss of supraspinal control on the thoraco-lumbar sympathetic cord. This isolated spinal cord reacted reflexively in all but one patient.

Patients with incomplete motor lesions (AIS D) and patients with lesions below T6 showed normal autonomic responses.

To assess autonomic dysfunction, a battery of tests is needed and should combine pressor stimuli above and below the lesion, and assess both cholinergic and sudomotor pathways.

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Assessment of the sympathetic level of the lesion in spinal cord injury patients

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Keywords: Spinal cord injury; Autonomic nervous system; Sympathetic assessment; Classification

Objective.— Determination of the sympathetic level of the lesion in spinal cord injury (SCI) patients.

Patients and method.— Thirty-eight traumatic SCI patients (18 tetraplegics and 20 paraplegics) presenting with a chronic lesion above T10 were assessed. There were 35 men and 3 women, with a mean age of 39.4 years \pm 11.3 and duration of evolution of 4.5 years \pm 5.0.

Scale A), 7 a complete motor but incomplete sensory lesion (AIS B), 3 a motor incomplete lesion (AIS D).

All underwent autonomic testing including sympathetic skin responses (SSR), Valsalva Manoeuvre, and reflex dermographism (skin axon reflex vasodilatation). Presence of palmar SSR and of blood pressure (BP) overshoot at the release of Valsalva is indicative of the integrity of the upper thoracic (T1–T4) sympathetic cord segment, whereas reflex dermographism assesses the T3–T12 sympathetic thoracic cord.

Results.— Fifteen out of 16 patients presented a good relation between absence of palmar SSR and absence of BP overshoot, indicating a sympathetic level of lesion above T1; 12 out of 14 patients showed a good relation between presence of palmar SSR and presence of BP overshoot, indicating a sympathetic level of lesion below T4.

In 28 patients with complete AIS A lesions, there was a good relation between reflex dermographism and autonomic testing, allowing assessment of the sympathetic level of lesion between T3 and T10. In patients with incomplete (AIS B-D) lesions, the relation was poor.

Discussion.— Autonomic testing (SSR and Valsalva) allow assessment of the integrity of the upper thoracic sympathetic cord (T1–T4). Reflex Dermographism comes in addition to further delimit the sympathetic level of lesion.

References

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Investigations of the Autonomic Nervous System: practical aspects

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In cases where symptoms are suggestive of autonomic disturbance (unexplained overactive bladder, voiding phase dysfunction . . .) specific testing for dysautonomia should be performed. Most explore the cardiovascular system: orthostatic hypotension, cold pressor test, hand grip test, stand test, 30/15 ratio, Valsalva ratio, deep breath test. The Schirmer test assesses dry eyes; the Saxon test and sugar cube test assess dry mouth. These tests are not invasive and are easy to perform without specific equipment.

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Sympathetic system and syringomyelia

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Keywords: Syringomyelia; Sympathetic system; Horner syndrome; Dyshidrosis; Neurogenic arthropathy

The spinal sympathetic system, from C8 to L2, is one of the first anatomical structures involved in syringomyelic cavity development. Its impact is variable but sometimes in the foreground of symptoms and signs.

The objective of this study is a review of physiopathology of numerous vegetative disorders which can be seen in syringomyelia. Moreover the review of the literature, we studied 54 cases of symptomatic post-traumatic syringomyelias followed in our departments.

This vegetative disturbance concerns pre-ganglionic area. We may first encounter cutaneous disorders such as dyshidrosis, with frequent sweating. Horner syndrome may also be seen as the only sign of the disease. Other visceral disturbances are quite difficult to distinguish from spinal cord automatism. Neurogenic arthropathies are also linked to vegetative troubles.